Neighborhood Planning for Community Revitalization

Upper Harbor Terminal Policy & Action Research Project Report

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July, 1997

by

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As part of the University of Minnesota Center for Urban and Regional Affairs Neighborhood Planning for Community Revitalization Center Intern Program.

September, 1996

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I. INTRODUCTION

A. Divergent Views

To many, the Mississippi River conjures up images of wild scenic beauty, plentiful wildlife, waterfowl and freshwater fish. Others see the river as a key commercial transportation link from the Midwest to the rest of the world, a 'working river' of great economic importance to this region. Urban centers located on the Mississippi River, such as Minneapolis and St. Paul, are confronted with the challenge of developing public policy that takes into account divergent viewpoints.

Unfortunately, most urban neighborhoods in Minneapolis have no physical connection to the Mississippi river. Even neighborhoods contiguous to the river's banks do not realize their connection to the river. Industrial corridors cut off citizen access to the river, preventing the experience of the majestic river by the people who live near it. Concerned residents of core urban neighborhoods along Minneapolis' northern borders of the Mississippi River understand that the river is more than a treasured natural resource and historic transportation route. It is also a key to future community revitalization.

Growth and development in the Twin Cities occurred to a large extent as a result of using the Mississippi River as a transportation route and hydropower source. As a result, land use adjacent to the river in the Twin Cities has been dominated by the needs of the 'working river'. Large sections of the river have become industrial corridors. Current debate over appropriate uses of the river reflects opposing views about whether the working river concept is a suitable model for the future.

One river-related planning effort on the horizon involves the re-evaluation of future uses of 41 riverfront acres occupied by Minneapolis' municipally-owned Upper Harbor Terminal (UHT). Many citizens have begun to question the value of the UHT to the Minneapolis river community. Recently the economic viability of the UHT has come under public scrutiny. Some believe the UHT no longer serves a vital purpose, while others view it as critical to the economic vitality of the Twin Cities.

The fate of the UHT is a central concern to neighborhood residents, businesses, elected officials and other policy makers. Specifically, whether the terminal is expanded, stays as it is, changes somewhat, or is closed in favor of other land uses will shape opportunities for future environmental restoration and community economic revitalization.

B. Report Overview

This report was written in response to the need for information expressed by members of various neighborhoods and citizen organizations including the Mississippi Corridor Neighborhood Coalition (MCNC). It is designed to help citizens participate in a meaningful way in planning efforts focused on the future of the terminal and upper harbor area.

The report work was done as part of the University of Minnesota's Center for Urban and Regional Affairs intern program. Staff from Citizens for a Better Environment (CBE) helped direct research and writing.

Information was obtained through a review of existing reports and data and interviews with various stakeholders including residents, business representatives, and government representatives. While the limits of this study did not allow for a comprehensive interviewing process, several key questions were posed to contacts in order to begin discovering stakeholders' general knowledge about the terminal and gauge the need for further information. Interviews were conducted by phone over a period of eight weeks. (See Appendix A for stakeholder categories developed for interview purposes and interview questions.)

Section II is an overview of the UHT's current uses and a history of management and economics. It also lays out the environmental conditions of the site.

Section III provides a summary of eleven different reports which include information on the UHT or its stretch of the river. Included in this section is a look at the many recommendations made over the past 25 years in regards to the area.

Section IV summarizes recommendations from these reports into a continuum of four options for future actions on the UHT.

Section V lists the author's recommendations.

An overview of the natural and geologic history, engineering history, and barge industry on the Upper Mississippi River are also included this report. (See Appendices B, C and D.)

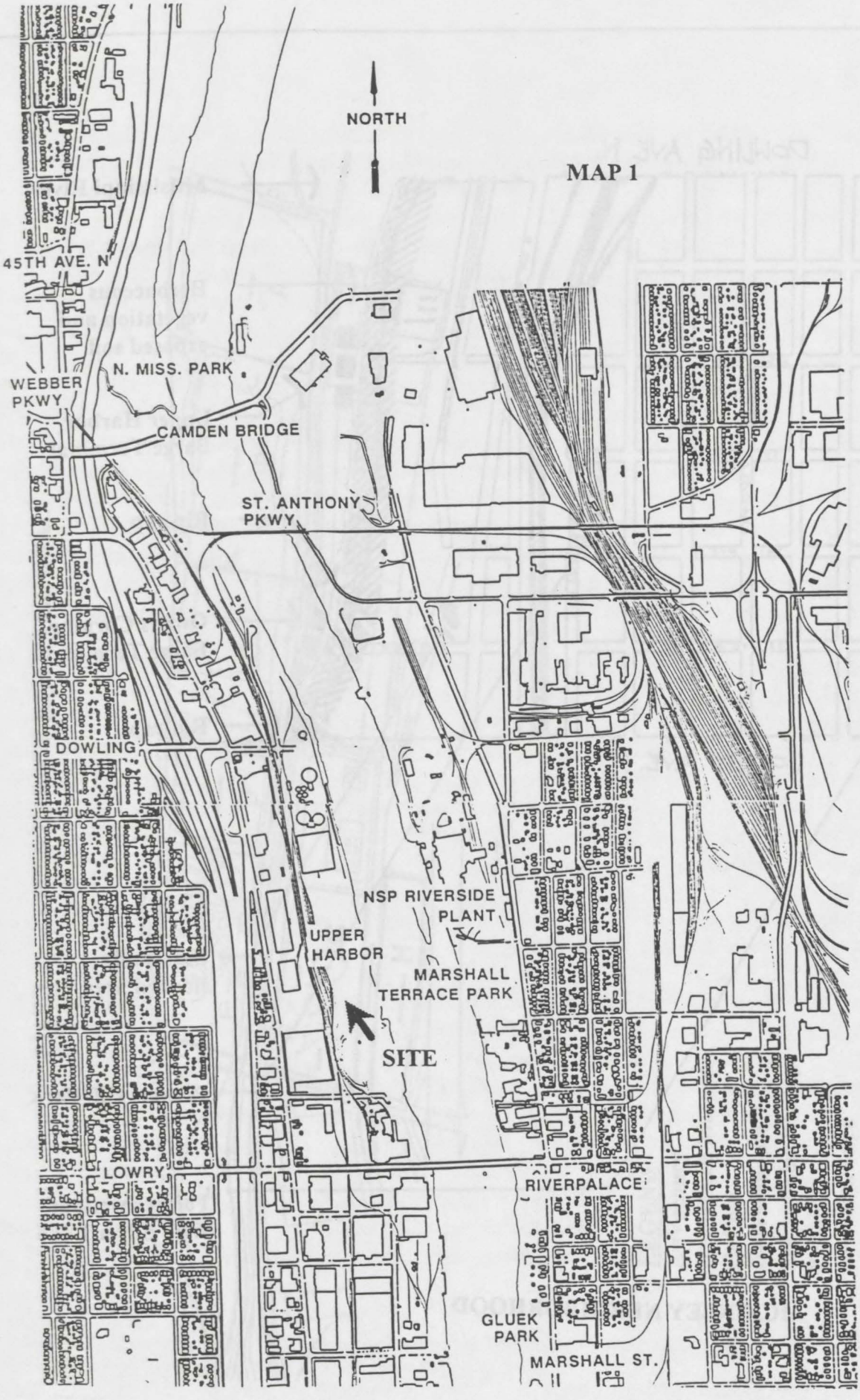
II. THE UPPER HARBOR TERMINAL

A. Purpose

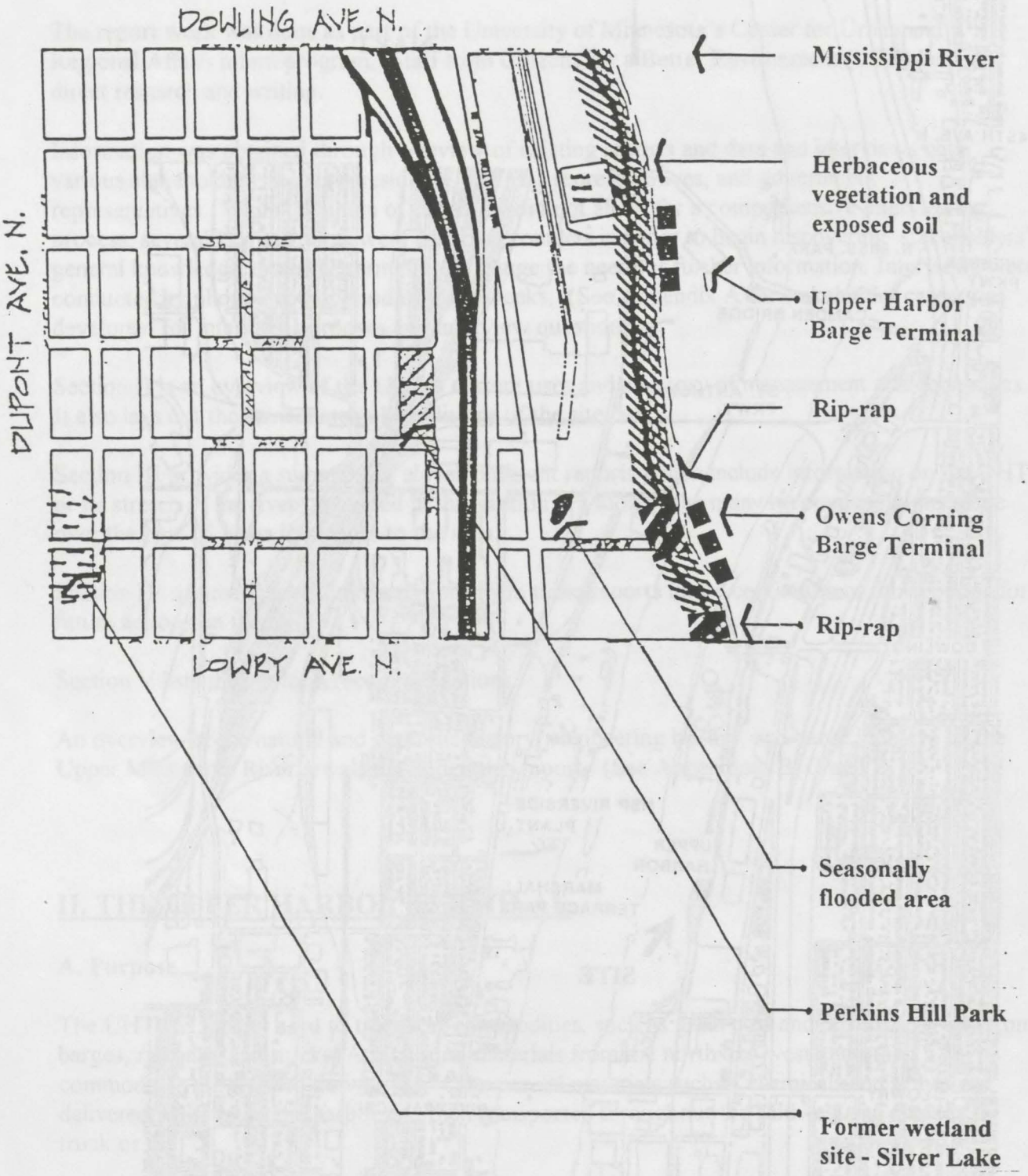
The UHT is a facility used to transport commodities, such as grain coal and fertilizer, to and from barges, rail cars, and trucks. Agricultural materials from the north and west and other commodities are shipped down river. Commercial materials such as chemicals and gravel are delivered by barge to the harbor and then transported throughout the Midwest and Canada by truck or rail.

B. Location in Relationship to Neighborhoods

The UHT is located in North Minneapolis on the west bank of the Mississippi River near Dowling Avenue. The terminal occupies 41 acres of riverfront property. (See Maps 1, 2 and 3.)

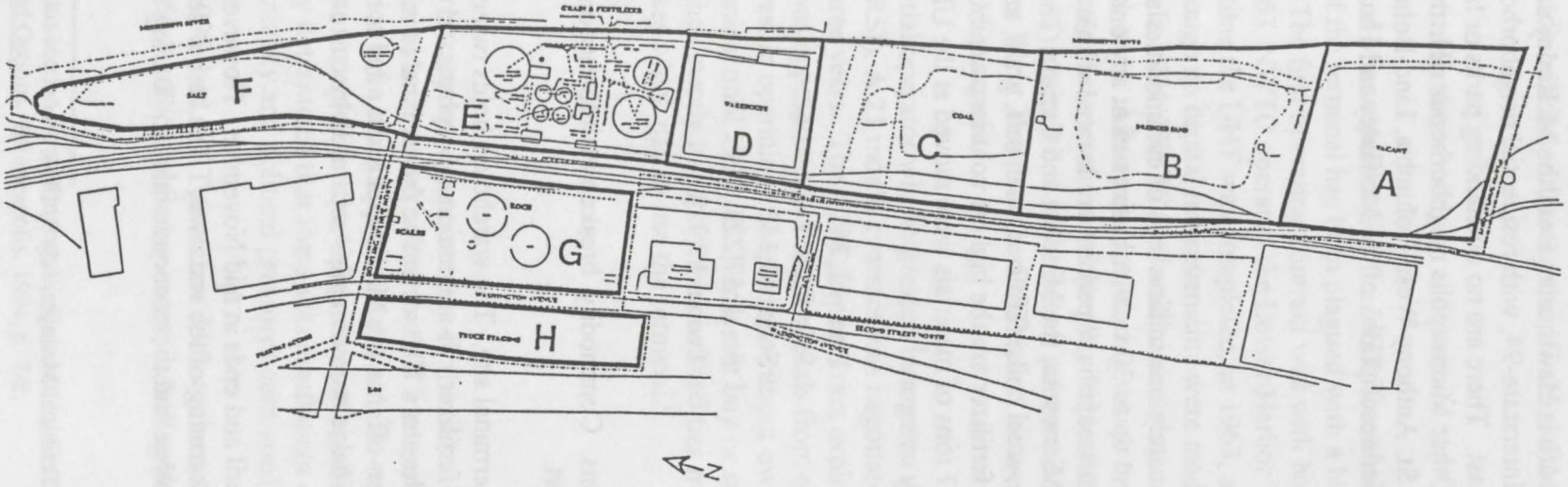

NORTH
45TH AVE. N
WEBBER PKWY
N. MISS. PARK
CAMDEN BRIDGE
ST. ANTHONY PKWY
DOWLING
NSP RIVERSIDE PLANT
UPPER HARBOR
MARSHALL TERRACE PARK
SITE
LOWRY
RIVERPALACE
GLUEK PARK
MARSHALL ST.

MAP 1



MAP 2 MCKINLEY NEIGHBORHOOD

MAP 3 UPPER HARBOR RIVER TERMINAL



LEGEND

A=Vacancy
B=Dredged Material
C=Coal
D=Warehouse
E=Granular Facility
F=Salt
G=Scales/Koch
H=Truck Staging

The McKinley neighborhood is adjacent to the North East Industrial Area which is home to the UHT. The adjacent neighborhood to the south is Hawthorne. Both the McKinley and the Hawthorne neighborhoods are bisected by Interstate-94, with residential neighborhood to the west and industrial uses (primarily) to the east. There are no outstanding parks or lakes. There is no public access to the Mississippi River. Other Minneapolis neighborhoods near the UHT are Bottineau, Camden, Near North, Sheridan, St. Anthony West, Columbia, Lind-Bohanon and Marshall Terrace. (See Appendix E. for brief descriptions of the McKinley and Hawthorne neighborhoods.)

C. Current Use

The UHT transports an average of approximately one million tons of commodities annually. The UHT serves six to eight major customers and up to 30 smaller businesses at any one time. Eight percent of these businesses are located in Minneapolis, 7 percent are located within the metro area, and 85 percent are located in greater Minnesota, the Midwest and Canada. The materials handled on the UHT lot include twine, pipe, steel coils, fertilizer, coal, salt, grain, and aggregate clay used in construction. Coal, grain, and fertilizer are the highest volume commodities handled at this particular terminal. In 1995, 804,887 tons of materials were moved at the UHT. The list below gives a break down of tons moved by category:[1]

Aggregate: 3,019
Coal: 118,471
Di-ammonium-phosphate: 3,921
Fertilizer: 103,774
Grain: 323,470
Mono-ammonium-phosphate: 18,146
Pipe: 11,761
Salt: 95,617
Sand: 53,662
Steel: 57,728
Twine: 15,318

In 1996 the total tonnage was 1,065,033 tons. Commodity breakdown information for 1996 was not readily available at the time of this report.

A number of storage facilities exist on the terminal site. The warehouse holds twine and steel coil. The storage domes hold two types of fertilizer, di-ammonium-phosphate and mono-ammonium-phosphate. Grain is stored in elevators. Salt arrives at the terminal in mid-July, intentionally later in the season to reduce run-off into the Mississippi River, and is stored in tarp covered piles on the north end of the lot. Coal is stored in piles separated by customer on the south end of the lot behind the warehouse.

The harbor season usually begins in mid April and ends in mid November. However, this schedule is susceptible to the freezing and warming of the waterway. The harbor season, especially its spring start, is dictated by weather and the economic market. During the high

[1] Interview with Jerry Christensen, Upper Harbor Terminal Manager, July 9, 1996.

season there are 21 hourly employees, six office staff and a few temporary employees when work load requires additional help. During the off-season this number is downsized by a third.

D. Management History

While the City of Minneapolis owns the UHT, five entities have operated it over its history. Management of the terminal has been plagued with a history of bankruptcy, court disputes, and lost revenues. The first operating contract was with Northern Waterways Terminals Corporation (NWTC) in 1963. NWTC operated the Lower Harbor Terminal (near Washington Avenue Bridge) at the time the UHT was completed, in 1963, and was then given the chance to operate the UHT - although no capital improvements were made on site until 1967 when NWTC built the office building. In 1974, NWTC declared bankruptcy and Minneapolis Public Works became the operator of both sites. After one year, during which time the docks lost approximately $500,000, the city contracted the operations of the terminal to Bolander Conlan Company. Their management was terminated in 1979 over a contract dispute. Contracts with Port Con-Agra in 1979 and Packer River Terminals in 1983 ended in lawsuits that resulted in favorable judgment for the City of Minneapolis.

The only potential operator who expressed interest in the terminal at the time was River Services Incorporated (RSI). A 21 month contract was negotiated with RSI, which was subsequently extended for three years. The three year contract expired in 1995 at which time the city determined it was appropriate to seek proposals from other potential operators. Only RSI expressed interest in operating the terminal without owning it. RSI now holds a contract to operate the terminal until 1999. RSI does not buy or sell any of the commodities stored on the terminal land, they merely transport the commodities from barges to rail or truck, or vice versa, for the businesses which pay to use the terminal.[2]

E. Economics

1. History

In 1937, Congress approved an extension of the Mississippi River channel and the creation of the UHT. Twenty six years passed before the UHT project was completed in 1963. At the same time, construction of a navigation channel was built on the Minnesota River which captured most of the commerce expected for the Upper Mississippi River in Minneapolis. An Army Corps of Engineers study determined that there was insufficient economic justification for the project. However, community and political pressures continued and Congress appropriated funds.[3]

According to 1996 data, UHT revenues do not cover the expenses. Annual revenues are approximately $2.8 million while expenses, including debt service, are approximately $3.5 million.

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[2] Information in this section from Minneapolis Community Development Agency, Upper Harbor Terminal: History, Status and Options. Minneapolis: 1994, p. 7-8.

[3] Ibid.

The annual debt service is approximately $1.1 million. The final debt service payment is due 1999. [4]

The UHT budgets are approved by the Minneapolis city council. The difference between revenue and expenses is paid by taxes approved by city council. The amounts that have been subsidized since 1990 may be seen in the following chart.[5]

Table 1: UHT Financial Losses 1990-1996

YEAR	ACTUAL LOSS
1990	866,000
1991	690,000
1992	650,000
1993	1,119,248
1994	1,108,832
1995	446,919
1996	840,000
TOTAL LOSS 1990 -1996:	$5,720,999

(See Appendix F. for the 1996 budget which shows specific income and expense categories.)

UHT losses are paid by tax increment financing funds (TIF funds) which are monies generated by increased property tax due to redevelopment of an area. TIF funds are allocated within a region in which they are generated, in this case, North Washington Industrial Park. Decisions as to the expenditure of these TIF funds are made by the Minneapolis city council.

Over its 30 year development period, $11.6 million was spent on UHT construction, and $1.4 million on land acquisition. General Obligation Bonds financed these capital improvements which included: an office building, grain and loading facility, 110,000 square foot warehouse, granular (grain and coal) transfer facility, three barge mooring areas, rail yard and internal roadway, petroleum handling and storage facility built for storage, transfer, and marketing of asphalt, high speed grain handling and storage facility, and four storage domes. Debt service amounts from 1990 through 1996 can be seen in the following chart.[6]

[4] Ibid., p.7
[5] MCDA Report, "Upper Harbor Terminal: Appropriation Increase for Fund CPA to Meet River Terminal Debt Service," Enclosure 2, 12/2/96.
[6] Upper Harbor Terminal: History, Status and Options, p. 8

Table 2: UHT Debt Service 1990-1996

YEAR	DEBT SERVICE AMOUNT
1990	1,120,435
1991	1,120,680
1992	1,107,020
1993	1,107,577
1994	1,108,832
1995	1,092,525
1996	1,082,650

Based on the reported information since 1990, the terminal would have generated an average of $291,729 annually if there were no bond payments. Once the debt is completely repaid, it is the intent of the MCDA to request authorization to use UHT revenues, at least in part, to repay the TIF fund for the tax funds it used to pay off the bonds.[7] Assuming no interest on the TIF loan, no changes in traffic on the river and no additional capital improvement bonds, the payout would take 20 years.

An MCDA report suggested that at the end of 1999, when the debt service has been paid off, the terminal will turn enough of a profit for the city to reimburse MCDA, to some extent, for its financial subsidies.[8] However, a timetable for payback is difficult to establish, MCDA does not predict any appreciable increase in commercial traffic on the Mississippi in Minneapolis, and revenue projections are difficult to make because average tonnage goes in five to seven year cycles and is affected by many factors including weather, international markets and laws.[9] Needs for capital expenses, repairs, and pollution control equipment also make the future profitability of the UHT difficult to predict.

The UHT is totally dependent on the existence of the St. Anthony Lock and Dam system which is operated and maintained by the Army Corps of Engineers at a cost of approximately $3.1 million per year in Minneapolis.[10] The Federal government provides these funds but one million tons of commercial activity per year is required to keep the St. Anthony Locks and Dams and the channel operating.[11]

Typically 1.5 million tons move on the river each year in Minneapolis with the UHT providing approximately a million tons.[12] However, one report stated that even with five operating terminals on the Upper River (four private and one public), the traffic volume does not cover the costs of

[7] Interview with Jim Forsyth, MCDA July 23, 1996
[8] Upper Harbor Terminal: History, Status and Options, p.22.
[9] Ibid. p. 19
[10] Ibid.
[11] Interview with Don Wilcox, US Army Corps of Engineers, Sept. 1996.
[12] Upper Harbor Terminal: History, Status and Options, p.15.

operating the locks and dams. No documentation was provided.[13] (See Appendix G. for photographs of the Upper and Lower St. Anthony Locks.)

Though conflicting information exists, it is widely believed that without UHT business, there may not be justification for continued operation of the St. Anthony Locks and Dams and dredging operations. Losing the terminal could have far reaching effects on river-dependent businesses on the Upper River and on accessibility of the upper river for recreational boating.

It has been suggested by members of the Army Corps of Engineers thatrecreational and other commercial uses will be taken into account when considering the future of the lock and dam system and therefore, activity on the Upper River. Requiring that Minneapolis pay a share in the operation and maintainence costs and shortening the navigation season have also been suggested to justify continued operation of the locks and dams.[14]

2. Difficulty Securing Economic Information

Economic information in the preceding section comes from the UHT's annual reports for the years 1994 -1996 and the UHT Report. It was not possible to obtain additional information. The City of Minneapolis owns the UHT with the MCDA as the responsible agency. MCDA staff, listed as the facility owner on state documents, told this author in June and July of 1996 that the river terminal manager requested that some specific economic information be treated as "proprietary."

In October, 1996 a formal request for disclosure was filed for the following information:

1) Identities of the users of the terminal for the past five years including a contact name and phone number for each user;
2) Rates charged to each user per ton per unit (ton, etc.);
3) Total fees charged to each user for the past five years; and
4) Annual reports and projected budgets for the past ten years.

The request was sent to the MCDA attorney by MCDA staff. In January, 1997, a determination was made by the MCDA attorney that they could not make a determination on the request as the property was owned by the City of Minneapolis. The request for disclosure was forwarded to the attorney for the City of Minneapolis. The Assistant City Attorney is spoke with RSI's attorney in regards to these issues.

On May 14, 1997 the Assistant City Attorney provided a written response to the request. He reported that there is sufficient reason to believe that the names of individual customers of the terminal are trade secret information. On a phone conversation, the attorney for RSI indicated a willingness to cooperate with neighborhood residents. The attorney stated that his client would provide information that is not trade secret information at the neighborhhood's request within reasonable constraints of business operations.

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[13] Scott Wende Architects, Conceptual River Corridor Plan, Minneapolis: 1994, p.7.
[14] Upper Harbor Terminal: History, Status and Options, p.26

At this time, the annual reports of the UHT for the past three years are available. Annual reports for prior years will be made available if requested by neighborhood residents. Standard rates for UHT users are also available but most rates are negotiated, so very little rate information was listed. Information about the identity of the users has not been given. As of July, 1997, MCDA staff has indicated that they will provide whatever customer information is in its posession once authorization is received from RSI.

F. Environmental Conditions

While a complete analysis of the environmental impacts of the terminal is beyond the scope of this report, several issues specific to the plant were explored These include permits, materials stockpiles on the site, contaminated sediments, and shoreline degradation.

One important issue not investigated is the comparative advantages and disadvantages of barge versus other modes of transportation. However, a brief review of materials indicates that barging is more energy efficient than railroads or trucking and may create less exhaust emissions.[15] (See Appendix H. for a chart of the relative energy efficiencies of different modes of transportation).

Through the MCDA, the City of Minneapolis has applied for state money for on-site environmental improvements. They are asking for $444,000 in 1997 and $65,000 in 1998.

1. Permits

Emissions from the UHT are monitored through state regulatory programs. The UHT has three permits: stormwater, air and hazardous waste.

The General Industrial Stormwater permit is authorized by the Minnesota Pollution Control Agency (MPCA). When an industry applies for a stormwater permit it has the responsibility to develop and implement a stormwater pollution plan within the first year. The MPCA does not specify what type of prevention structures should be developed on site, this is left up to the permittee and subject to approval by the MPCA. In subsequent years it implements the plan and reports to the MPCA how the plan has been implemented. No other reporting to the MPCA is required at this time, however the MPCA is planning to require submission of annual reports. In general, the MPCA will inspect a site only if someone from the public complains about a site.

The stormwater permit was issued in 1992 to RSI. The facility owner is listed as James Forsyth from the City of Minneapolis at the MCDA. The stormwater pollution prevention plan was submitted in 1993 and implemented in 1994. Implementation included creating berms (mounds of dirt) to divert water into small holding ponds to settle out the salt and coal. The plan included a settling area for dredge spoils, but this was not reported in the implementation plan. The 1994 implementation report also included a plan to purchase monitoring equipment for water quality testing, but results did not have to be submitted to the MPCA. No complaints from the general public were reported. No violations of the stormwater permit were listed in the file.

[15] Environmental Impacts of Modal Shift, MNDOT,Ports and Waterways Section: No year given, Preface.

The Air Quality Permit is issued by the Minnesota Pollution Control Agency when an industry has the potential to emit air pollution over certain thresholds. The UHT has installed numerous devices to reduce the amount of dust and particulate matter that is dispersed into the air. No violations to the air emissions permit have been noted; however, in 1991 the MPCA requested the installation of a water spraying device which would reduce the amount of coal dust. In 1994, as a result of another site investigation, the water sprayer was again requested by the MPCA. In 1996, an additional letter was sent requesting the water sprayer. There was no report indicating that the device has been installed.

The hazardous water permit was not reviewed for this report.

2. Salt and Coal Piles

Salt and coal are stockpiled on the site. RSI has created berms to divert the stormwater runoff into settling ponds on site which are designed to remove the majority of coal and salt particles from the stormwater runoff before it reaches the river. Water quality monitoring results were not available. During a site visit, the terminal manager stated that RSI is working with the University of Minnesota, Landscape Plant Development Center, on a research project in attempt to more effectively control the run-off with a natural buffer of vegetation and berms.[16] Establishing indoor storage facilities on site is the most effective way to eliminate stormwater runoff problems. There is no current plan to move the coal and salt piles to indoor storage, but it is a costly solution.[17]

According to several neighbors, during the stockpiling process the salt and coal piles are left uncovered. Large clouds of coal dust are blown from the piles into the air. As salt is moved from the barges to the storage piles, quantities are lost into the river. Clouds of salt rise into the air each time the crane drops a load into the hopper. RSI tries to avoid unloading on windy days to minimize impacts. Prior to 1997 quantities of salt are also lost in the unloading process, as salt slides down the riverbanks into the water. All salt handled in 1997 and thereafter will be trucked or conveyored from the terminal dock to storage piles. This will essentially eliminate spillage. The recent grant application addresses some of these concerns. (See Appendix I. for photographs of salt and coal piles.)

3. Contaminated Sediment and Dredge Material

Dredging a channel in the Mississippi River is needed for the Corps of Engineers to maintain a channel to the UHT and for other users. Dredging can be an environmental issue because contaminants can accumulate over time in the sediments of the river. For example, even though the use of DDT has been banned in the US since 1972, enough DDT remains stored in some river sediments to continue bioaccummulation in bottom-feeding catfish.[18] Unacceptable levels of polychlorinated biphenyl (PCBs) have been found in the Minneapolis-St. Paul corridor sediments.[19]

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[16] Interview with J. Christensen, July 9, 1996.

[17] Ibid.

[18] Ann Robinson and Robbin Marks, Restoring the Big River, Minneapolis, Izaak Walton League and Natural Resources Defense Council: 1994, p. 9.

[19] Ibid.

Dredging the channel re-introduces hazardous contaminants into the river environment by re-suspending contaminated materials in the moving water. The process of dredging can re-release contaminants into the water column again and again. This release gives contaminants another opportunity to enter the food chain through aquatic life. [20] Contaminants can also be re-introduced into the water column by barges stirring up sediments.

The potential releases of contaminants is a concern for the Army Corps of Engineers. The Corps tests dredge material regularly and has found undetectable levels of contaminants in the sites near the UHT.[21] The dredge material is clean enough to sell as backfill for construction purposes. The Army Corps of Engineers' tests were not reviewed for this report.

Dredge spoils are deposited by the Army Corps of Engineers in large piles at the south end of the terminal prior to sale. There was no information in the stormwater permit as to how the river was being protected from the dredge pile runoff even though a need was mentioned in their pollution prevention plan.

4. Shoreline Degradation

Erosion which causes sediment pollution is one of the biggest problems on the Mississippi. Some think the worst shoreline degradation on the Upper Mississippi River is in the area of the UHT.[22] The only visible vegetation on the terminal site includes a few sparse bushes between the coal piles and the river. River advocates informed the author that no natural vegetation buffer is present at the terminal site to prevent shoreline erosion. The recent grant application includes moneys for vegetative plantings for erosion control.

5. Soils

An environmental evaluation of terminal soils was conducted in 1993 when MCDA contracted with STS consultants for an on site assessment.[23] According to the terminal manager soil samples obtained from core drilling around the warehouse and train tracks showed no signs of hazardous wastes.[24] In their assessments, STS has stated that "operations at the Upper Harbor Terminal facility are conducted in an environmentally sound manner consistent with current government regulations."[25]

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[20] Ibid.
[21] Interview with J. Forsyth, April 9, 1997.
[22] Conceptual River Corridor Plan, p.10.
[23] Upper Harbor Terminal: History, Status and Options, p.14.
[24] Interview with J. Christensen, July 9,1996.
[25] Upper Harbor Terminal: History, Status and Options, p.14.

III. REVIEW OF HISTORIC/CURRENT RECOMMENDATIONS

The stretch of the Mississippi River where the UHT is located has been the subject of numerous reports and is currently the subject of several long range planning efforts. This section gives a brief overview of some of the significant studies which influence and reflect policy making for the area. Although few reports deal directly with the UHT, it is important to understand the long range planning context of the Upper Mississippi River when considering the terminal's future. This section presents an overview of recommendations made in several documents that address the river generally. Additional documents of interest may include the "Mayor's Task Force" and "Strategic Plan". The author did not become aware of these documents in time to include it in this report.

A. *Mississippi/Minneapolis,* Minneapolis Planning Department, 1972

This report discusses historical land uses and issues pertinent in 1972. Although outdated, this report is still useful in its discussion of the uses of the river and reflection upon the future of the UHT.

The report states:

Although the rate of growth of commercial barging activity has not fully lived up to forecasts made at the time the Upper Harbor Project was completed, it is nevertheless now enjoying a measurable increase. At the same time the full value of this activity must be based in part on the diversification of available transport modes that it helps to provide, and not simply on present barge shipments by volume. Minneapolis locks are narrower than all others on the Mississippi, accommodating only one barge-width. Barges are therefore separated below St. Paul and delivered to Minneapolis one or two at a time. Both recreational boat traffic and barge traffic are expected to increase on the river in Minneapolis in the coming years. Some of the minor problems which exist today may well be magnified by this expanded activity.[26]

Recommendations:

- The Upper River area, from Plymouth Avenue N. to the Camden Bridge, with a few exceptions on the east side, should be preserved as an industrial area.
- Industry and commerce who use the river directly for barging should have the highest priority for river frontage on the upper river, above Plymouth Avenue.
- The City's efforts to maintain a favorable freight rate structure should be strengthened by continual improvement of its Municipal Terminal to meet the needs of industries desiring to use barge transport, but lacking river frontage or private terminals.

[26] Minneapolis Planning Department, Mississippi/Minneapolis. Minneapolis: 1972, p. 24.

- Industry located in the remainder of the upper river area should offer the greatest possible number of jobs to local residents.
- Public access to the river edge should be restricted where barges are being loaded/unloaded due to the potential hazards of pedestrian activity in a work area.
- An observation area or platform, should be established and accessible from 36th Avenue N. near Folwell Park, where visitors can observe the loading and unloading of barges. Ideas for enhancing the industry's image to visitors include, painting cranes and barge tows in bright colors and posting schedules for the arrival and unloading of barges.
- Wherever the river is not being directly used at the Municipal Terminal, a vegetation screen should be planted.
- Eliminate industrial backyards on the river's edge, including stockpiling and unscreened automobile parking or truck loading along the banks of the river.[27]

B. *The Mississippi River in Minneapolis,* Minneapolis Park and Recreation Board, 1975

This report was written in response to the dramatic growth in public interest in reorienting the river." The report states, "People have become aware that the river offers aesthetic, recreational, and environmental values as well as the important transportation, commercial, and industrial opportunities."

Recommendations:

- The Mississippi River in Minneapolis should be accessible for recreational use.
- The Park and Recreation Board should lead an effort to assure the development and opening of the river for public recreational use.
- Non river-dependent entities should not be established on the river front.
- A corridor should be established for the full length of the river on both sides.
- Conduct a study, in cooperation with the Army Corps of Engineers, to determine where dredge spoils might be useful to enhance recreational opportunities. Promiscuous placing of dredge materials should not be permitted.
- River frontage should be acquired for park purposes.
- Set-back requirements should be established for the length of the River.[28]

Upper River Recommendations:

- In addition to the existing land uses along the upper river public use of the river corridor should be accommodated.
- Industrial waterway transportation viewing opportunities should be preserved.
- A 300-foot minimum set-back should be required for all housing, industrial and commercial structures.

[27] Ibid., pp. 41-74.
[28] Minneapolis Park and Recreation Board., The Mississippi River in Minneapolis, 1975 pp. 17-20.

- Public access to the river should be provided, especially where non-residential uses stand between the river and the residential neighborhoods; industries should be encouraged to provide safe and attractive public access opportunities along the corridor system.
- Planting of the riverfront and corridor to return its natural beauty and provide habitat should be encouraged.[29]

C. *Report to the Minneapolis Park and Recreation Board,* Long Range Regional River Development and Acquisition Committee, 1977

The objective of this planning document is to recognize compatible and complementary industrial, commercial and residential usage. A program of acquisition and development is proposed along the entire Mississippi River frontage in Minneapolis to provide optimum recreational opportunities for the citizens.

Recommendations:

- Planning for the north river should integrate public access and recreational open space systems with industries, transportation routes, and commercial activities of the area.
- Where river-dependent industries having a direct need for access to the river (i.e. NSP) are located along the upper river, pedestrian corridor should be developed around, through, over or under those industries.
- Acquire river frontage in future business which no longer need direct access to the river's edge.
- North of Lowry, setback storage to accommodate river corridor but ensure compatibility with appropriate transportation, commercial, and industrial uses of river's edge.[30]

D. *The Upper River In Minneapolis: A Concept Plan for Discussion,* City of Minneapolis Planning Department, 1985 (Revised 1995)

In this plan the City of Minneapolis Planning Department attempts to reconcile the various "personalities" of the river including: a working river with ports and barges, an industrial site with non-river related enterprises, a residential site in several places, and a recreational amenity.

The report states:

Current city policy calls for increase in barge traffic, dictating that the upper river will be industrial for the foreseeable future..... By nature, on the other hand, the river is an amenity. This imperative will never change, and is particularly strong for a national resource like the

[29] Ibid., pp. 10-11.

[30] Report of the Long Range Regional River Development and Acquisition Committee to the Minneapolis Park and Recreation Board, 1977 pp. 10-14

Mississippi River. People are drawn to bodies of water, they are soothed by them, particularly in an urban, fully developed area. Water bodies provide quiet respite from urban bustle. Their mystique predetermines that the upper river will forever remain a powerful psychological and recreational attraction..... Here then is the essential problem with the upper river. City policy and actions dictate that it be a working river; yet it is a natural and abiding amenity demanding public access. And this basic problem is compounded by historical and existing barriers, from I-94 and railroads, insensitive and even dangerous industry, to topography.

Recommendations

- With the exception of barge terminals, the riverbank should be replanted within ten years.
- The river should be protected from erosion.
- Increased pedestrian traffic and beauty along the riverfront will increase the value of riverbank land.
- In order to retain full service of the upper and lower St. Anthony locks, the Upper Harbor should increase its volume of business and river-dependent industries should be encouraged to locate or expand on the west bank.
- Public access to the river should be increased for activities such as sitting, walking, fishing, boat, etc.
- Non river-related industries should eventually be encouraged by city policy to relocate.
- All industries should landscape to provide a continuously attractive river appearance form either bank in the short-term.
- Railroads along the Upper River are rarely used and should be removed over time, with the exception of those that serve river-dependent uses (UHT).[31]

E. *Upper Harbor Terminal: History, Status and Options,* Minneapolis Community Development Agency, 1994

This report is the sole document which addresses the current status and issues surrounding the UHT in depth. It lists multiple reasons for examining the future of commercial navigation in Minneapolis, including a renewed neighborhood interest in the river, the new zoning code, the new activity by the National Park Service, the viability of commercial navigation in the Twin Cities and the viability of the UHT.

Stating that the viability of the terminal is questionable, the report presents eight options for the site. Four land use recommendations are: commercial, residential, park land, or a combination of these. The other four recommendations include some variations of industrial use. Options for industrial land use include: retaining the river terminal as is; redeveloping the entire site for light industrial use; retaining 14.25 acres of river terminal and converting the unimproved land to the north and south of the facilities and the truck staging area on Washington to light industrial or

[31] City of Minneapolis Planning Department, The Upper River In Minneapolis: A Concept Plan for Discussion, 1985, pp. 7-17.

river-dependent industry; and relocating selected industries to the site (i.e. businesses which have been the source of neighborhood - not environmental - complaints).

Recommendations:

- A feasibility study and analysis of each of the options should be performed to identify a long term course of action.
- Make short term improvements on the existing terminal while long term options are investigated.
- MCDA staff should work with involved agencies, private sector and the public to examine both short and long term recommendations. Recommendations should then be brought to the city council for consideration.[32]

F. *Conceptual River Corridor Plan*, Scott Wende Architects, 1994

This report studies existing neighborhood revitalization efforts, economic development, land use, urban design, transportation, parks and open space from a neighborhood-based perspective. The project area is the Mississippi River corridor and the adjacent neighborhoods in the North and Northeast Minneapolis from Hennepin Avenue and Nicollet Island to the north city limits. Existing conditions, issues, opportunities and constraints were inventoried. A conceptual corridor plan was presented. Implementation steps, strategies and potential projects are outlined for use by neighborhood organizations. (See Map 4.)

The plan states:

The first step in providing a neighborhood-based agenda for the river corridor [the report] catalogues the work completed the first year. The Conceptual River Corridor Plan has been undertaken to address the issues of existing land use, improving river access for the neighborhoods and combining these with redevelopment opportunities.[33]

Recommendations:

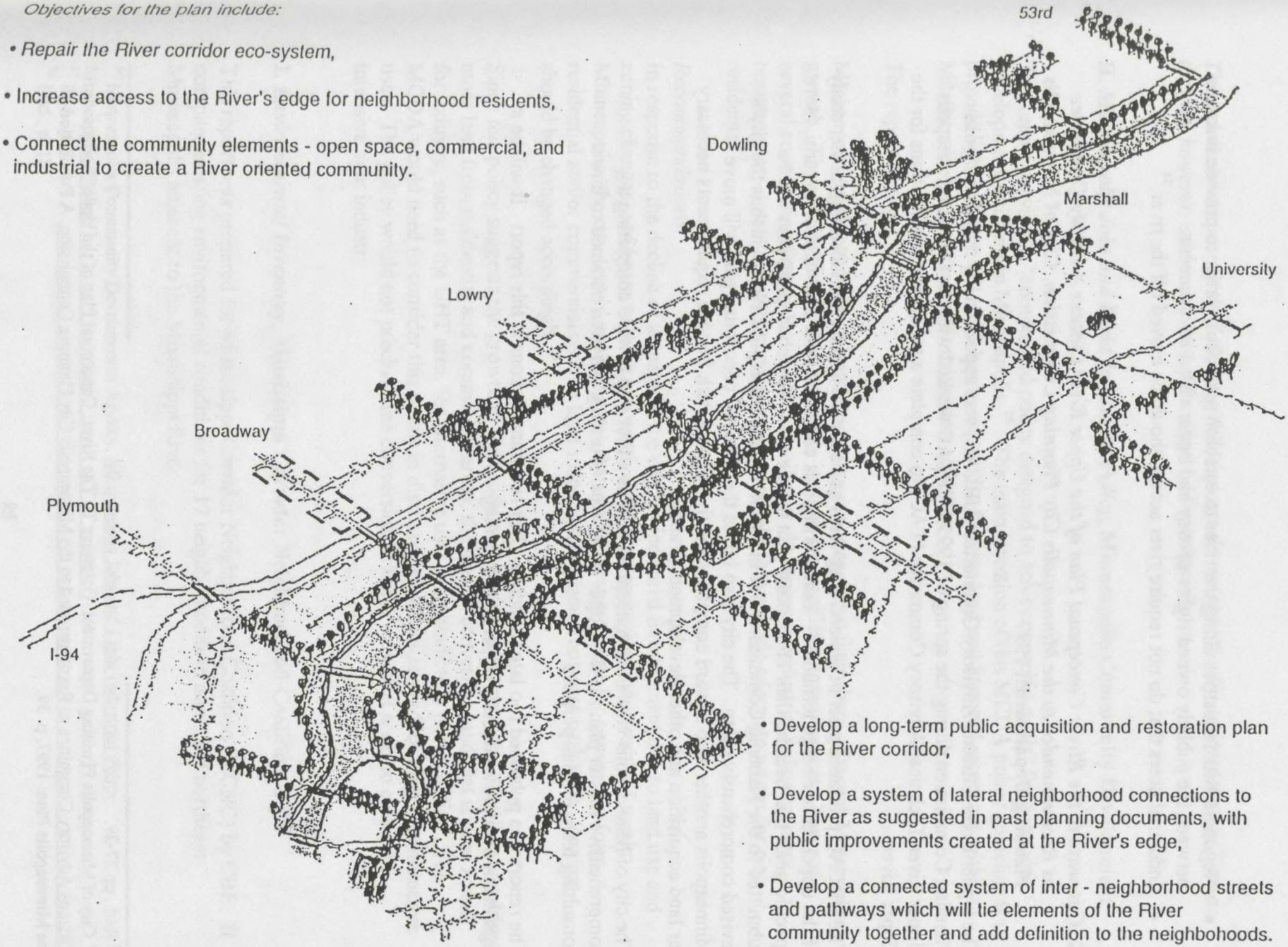
- Current degradation of shoreline conditions must be stopped and a program for restoration of the river's natural ecosystem needs to be implemented.
- In order to increase river access for neighborhood residents, a long-term acquisition plan of shoreline along the river corridor should be developed.
- Redevelop outdated and under-utilized land uses that occupy river's edge within the corridor for the following land uses: parks and open space, housing, retail, and where appropriate office.
- Increase neighborhood access to the river by using publicly owned rights-of-way (i.e. old railways) for pedestrian corridors.

[32] Ibid., p.27.
[33] Conceptual River Corridor Plan , p.2.

Objectives for the plan include:

Objectives for the plan include:

- *Repair the River corridor eco-system,*
- Increase access to the River's edge for neighborhood residents,
- Connect the community elements - open space, commercial, and industrial to create a River oriented community.



- Develop a long-term public acquisition and restoration plan for the River corridor,
- Develop a system of lateral neighborhood connections to the River as suggested in past planning documents, with public improvements created at the River's edge,
- Develop a connected system of inter - neighborhood streets and pathways which will tie elements of the River community together and add definition to the neighbohoods.

CONCEPTUAL APPROACH

MISSISSIPPI CORRIDOR NEIGHBORHOOD COALITION

Scott Wende Architects

MAP 4 **MCNC COMPREHENSIVE CORRIDOR PLAN**

- Negotiate with industries along the river to establish setbacks in order to provide linkages between the publicly owned rights-of-way and better visual environment.
- Industrial users that do not require river access should be moved off the river.[34]

G. *Gateways to the River: Conceptual Plan of the Upper River Citizens Advisory Committee as Recommended to the Minneapolis City Planning Commission,* City of Minneapolis Planning Department, 1997

The Upper River Citizens Advisory Committee (URCAC) was appointed by the Minneapolis Planning Commission during the spring of 1995. URCAC worked with the City of Minneapolis' Upper River Technical Advisory Committee (TAC) to complete a set of recommendations for the Upper River.

The URCAC produced a set of general long-term goals for the upper river including further study of the upper harbor barge terminal.[35] Long term goals combined with a set of shorter-term, more specific goals that became their conceptual plan for the area. The conceptual plan will be submitted to the Planning Commission for inclusion in the Minneapolis Plan, which is the city's revised comprehensive plan. The city also hopes the URCAC conceptual plan will move Minneapolis another step toward compliance with National Park Service requirements necessary for land acquisition and other development grants.

The city of Minneapolis views the conceptual plan as a first step toward completing a comprehensive master plan for the Upper River area. Funding has been obtained to hire a consulting team for this purpose.

The report was published too late to include their recommendations in this report. It will be a significant document affecting upper river planning.

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[34] Ibid., pp 27-29.

[35] City of Minneapolis Planning Department, Gateways To The River: Conceptual Plan of the Upper River Citizens Advisory Committee as Recommended to the Minneapolis City Planning Commission, A Publication of the Minneapolis Plan: 1997, p. 39.

The recommendations of the following four reports do not specifically address the UHT area; they do, however, address issues of the Upper Mississippi River.

H. *Minneapolis Jobs and Light Industrial Policy,* Minneapolis Community Development Agency, 1989

This report provides a "coordinated policy designed to achieve specific goals" for economic development activities in Minneapolis.[36] The main intention of this MCDA policy guideline is to provide light industry and small businesses with adequate land and financial resources within Minneapolis for start-up and/or expansion activities.

The report states:

Minneapolis neighborhoods' industrial areas have not captured their share of recent Metropolitan growth. They are lagging behind, and there is room for significant improvement. There are several contributing factors that present significant challenges to industrial redevelopment, business start-up and growth, and the creation of jobs that provide adequate wages for city residents.[37]

Recommendations:
In response to the decline of acreage in the city for industrial development due to land use and zoning changes, and because there is a relatively low percentage of industrial land use in Minneapolis, the city should analyze areas that would be appropriate for conversion from residential and/or commercial uses to light manufacturing/small business park uses. Zoning should be changed accordingly.[38]

Since this policy suggests the growth of light industrial zoning in Minneapolis as well as acquiring more land from residential and commercial areas, the idea of converting land that is now zoned for industry, such as the UHT area, for alternative uses is contradictory to this policy. The MCDA would need to consider this policy in discussions with citizens advocating for alternative uses. The policy would not preclude the conversion of heavy industrial areas to clean, job-intensive light industry.

I. *Environmental Inventory,* Mississippi Corridor Neighborhood Coalition, 1994

This report was prepared for Mississippi Corridor Neighborhood Coalition (MCNC) by CBE. It compiles existing environmental conditions for 17 neighborhoods in north and northeast Minneapolis adjacent to the Mississippi River.

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[36] Minneapolis Community Development Agency, Minneapolis Jobs and Light Industrial Policy. Minneapolis:1989, p.1.
[37] Ibid., p. 7.
[38] Ibid., p. 18.

Recommendations made in the report are divided into three general categories:

1) Industrial Pollution
2) Water Quality
3) Land Use

1) Industrial Pollution

- MCNC should develop a strong pollution prevention program in conjunction with the Minnesota Office of Waste Management community assistance program. This would help ensure:
  a) The 19 companies who report compliance with the Minnesota Toxic Pollution Prevention Act (TPPA) to the Minnesota Pollution Control Agency (MPCA) meet legal standards as well as fulfill the objective to reduce or eliminate toxic chemical pollution
  b) Small businesses, schools, parks, doctors which generate hazardous waste which are not covered by TPPA work with MCNC to cut pollution.
- MCNC should establish a program to track permit compliance and enforcement of any violations.
- MCNC work with the city to ensure the corridor area receives priority in the effort to update the city's record system on noise and odor complaints.[39]

2) Water Quality

- The report states, "Storm water runoff is the major source of water pollution" within the upper river corridor.
- MCNC should organize volunteers to monitor discharges at key points.
- Partnerships for a storm water program could include local business associations and the city. Possible resources and partnerships could also include the Metropolitan Council, National Park Service and MNRRA.
- In the long-term MCNC should work to reclaim natural systems which were destroyed in the corridor area's first round of development.[40]

3) Land Use

- MCNC should take a lead role in the discussions at the local, state, and national level regarding the handling of contaminated sites for remediation and development.
- As part of its work MNRRA resources will be used to improve compliance with Minnesota Critical Areas Act. Under this act, local communities are required to do land use plans for the river. Local communities will also be offered incentives through MNRRA to go beyond critical area requirements. MCNC should assess the current critical area plans for the MCNC area and then recommend improvements for the plan working with local politicians to leverage the MNRRA resources.

[39] Mississippi Corridor Neighborhood Coalition, Environmental Inventory, Minneapolis: 1994, pp. 16-17.
[40] Ibid, pp. 17-18.

- MCNC should support efforts by the Minnesota Department of Natural Resources and Minneapolis to do a detailed survey and inventory that addresses such issues as vegetation, soil erosion, and bank slope. [41]

J. *Mississippi National River and Recreation Area,* Mississippi River Coordinating Commission and National Park Service, 1994

In 1988 Congress declared 72 miles of the river from Hastings to Dayton as the "Mississippi National River and Recreation Area," (MNRRA) to be managed by the National Park Service (NPS). The MNRRA plan, which includes the upper harbor area, discusses this designation's implications for the river's ecosystem and communities. Although this plan does not give authority to NPS to stop pollution directly or to acquire land, the plan does discuss future uses and concepts which may revive the river's health, aesthetics, and asset as a recreational source. Portions of this plan are pertinent to the discussion of the terminal's future use since the terminal must be involved in every discussion of the river.

Recommendations:

- Continuous public or private open space along the river will be connected to downtown and neighborhoods by trails wherever possible.[42]
- Shoreline restoration and rehabilitation programs and guidelines will be established for degraded downtown and historical districts.[43]
- Land acquisition could include a fee-simple purchase or donations and scenic and trail easement purchase or donation. [44]
- Uses that replace activities that cause adverse effects on the corridor and enhance resources identified in the MNRRA will be encouraged.[45]
- Develop incentives to encourage non river-dependent polluting industries to relocate out of river front area.[46]

K. *Restoring the Big River,* Ann Robinson and Robbin Marks, 1994

This report discusses the issues surrounding the Clean Water Act and the entire Mississippi River.

The report states:

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[41] Ibid, pp. 18-19.
[42] Mississippi River Coordinating Commission and National Park Service. Mississippi National River and Recreation Area. U.S. Department of the Interior: 1994, p. 14.
[43] Ibid., p. 141.
[44] Ibid., p. 24.
[45] See schmatic in: Mississippi River National Recreation Area, p.17.
[46] Ibid., p. 14.

Non-point polluted runoff impairs more water bodies, surface and ground, urban and rural, than any other pollution source in the country.[47] In addition, to be successful, efforts to protect and restore the Mississippi must be based on watershed strategies that account for land uses in the watershed and their downstream impacts.[48]

Recommendations:

- In order to persuade landowners who cause degradation to incorporate water sensitive practices into the way they do business, require that they develop and implement water quality plans which would improve water quality in the entire Mississippi River watershed. These practices should be phased in over a reasonable time to accommodate the unique needs of a landowner's operations.[49]
- Pollution prevention requirements should include the following run-off controls to strengthen Section 319 of the Clean Water Act:
  1) For redevelopment of existing developed area, implement runoff reduction methods such as revegetation and impervious surface reclamation.
  2) For existing stormwater systems, use conventional stormwater treatment devices, such as extended detention ponds, infiltration trenches and catch basins.[50]
- Require all agencies charged with managing the River make a real commitment to protecting water quality and restoring the health of the Mississippi's ecosystem.[51]

IV. FUTURE SCENARIOS

Recommendations concerning the future of the UHT from the eleven studies reviewed can be divided along a continuum of options:

A) Expand the terminal operations;
B) Keep terminal operations as they are;
C) Keep the terminal open but change some operations; and
D) Close the terminal and use the land for other purposes.

The following discussion summarizes the options without an analysis of the positive and negative attributes of each alternative.

[47] Restoring the Big River, p. 19.
[48] Ibid., p. 33.
[49] Ibid.
[50] Ibid., p. 35
The Upper Harbor Terminal already has some of these in place.
[51] Restoring the Big River, p. 47.

A. Expand Terminal Operations

1. Encourage private industries which are not using their terminals to capacity to use the UHT instead of their own terminals. "Inefficient terminals operating far below their capacities...deter other river-related uses. Under utilized terminals should therefore be encouraged to increase their tonnage, consolidate if feasible, of transfer their operations to the upper (municipal) terminal." Source: The Upper River in Minneapolis, A Concept Plan for Discussion, 1985 Revised 1995, p.6.

2. Encourage river-dependent industry to locate or expand on the west bank of the Upper River. This would entail creating or refining city policy to ensure the west bank of the Upper River continues to be zoned for heavy industry. In addition, the UHT would increase its volume and, as a result, the upper and lower St. Anthony locks would be retained for full service. Source: Upper River in Minneapolis, A concept plan for discussion, Minneapolis Planning Department, 1985 (Revised 1995).

B. Keep Terminal Operations As They Are

1. Preserve the Upper River area, from Plymouth Avenue to the Camden Bridge, with a few exceptions on the east side, as an industrial area. Those industries which need to use the river directly for barging should be given highest priority to locate on the Upper River. Moreover, the river edge of the district where barges are being loaded should be regarded as a work area in which public pedestrian activity would constitute both an interference and potential hazard. Safeguards should be developed to prohibit pedestrian movement from this segment of the river bank. Source: Mississippi/Minneapolis, Minneapolis Planning and Development, 1972.

2. Present land uses along the Upper River are appropriate but they should accommodate public use of the river corridor. In addition, industrial and commercial users requiring proximity or access to the river's edge should be encouraged to provide safe and attractive public access opportunities along the corridor system. Source: The Mississippi River in Minneapolis, Minneapolis Park and Recreation Board, 1975.

3. Regarding environmental conditions at the UHT, it is recommended that river communities establish a program to track permit compliance and enforcement of any violations. Those communities should also work with the city to ensure the corridor area receives priority in the effort to update the city's record system on noise and odor complaints. Furthermore, corridor communities should encourage and support efforts by the Minnesota Department of Natural Resources and the City of Minneapolis to do a detailed survey and inventory that addresses such issues as vegetation, soil erosion, and bank slope. Source: Environmental Inventory, MCNC, 1994.

C. Keep Terminal Open But Change Some Operations

1. Continue operations of the vast majority of the capital improvements which are grouped together in a 14.25 acre lot. The unimproved land to the north and south of the facilities and the truck staging area on Washington would be then be redeveloped for light industrial or river-dependent industry. Source: Upper Harbor Terminal: History, Status and Options, MCDA, 1994.

2. Most recommendations which would entail keeping the terminal open but changing some of the operations involve improvement of the environmental conditions at terminal. It should be noted that many of these recommendations are made with the assumption that environmental conditions would be improved in the short-term, but a long-term plan to close the UHT, would follow. The most prominent recommendation for short-term action is to move the stock piles away from the river. This would include establishing a vegetation buffer along the riverbank between coal and salt piles to reduce run-off and in any location where the river is not directly used for loading and unloading of barges. The coinciding long-term recommendation requires the terminal to eliminate all open storage. Sources: The Mississippi River in Minneapolis, Minneapolis Park and Recreation Board, 1975. The Upper River in Minneapolis: A Concept Plan for Discussion, City of Minneapolis Planning Department, 1985 (Revised in 1995). Restoring the Big River, Izaak Walton League, 1994. Conceptual River Corridor Plan, Scott Wende Architects, 1994.

3. Since the issue of run-off and storm water pollution is so prominent in regards to the terminal it has been recommended that communities should organize volunteers to monitor discharges at key points. This storm water program could include local business associations and the city where resources and partnerships may be possible through the Metropolitan Council, National Park Service and Mississippi National River and Recreation Area. Source: Environmental Inventory, MCNC, 1994.

4. Regarding environmental conditions at the UHT, it is recommended that river communities establish a program to track permit compliance and enforcement of any violations. Those communities should also work with the city to ensure the corridor area receives priority in the effort to update the city's record system on noise and odor complaints. Furthermore, corridor communities should encourage and support efforts by the Minnesota Department of Natural Resources and the City of Minneapolis to do a detailed survey and inventory that addresses such issues as vegetation, soil erosion, and bank slope. Source: Environmental Inventory, MCNC, 1994.

Since shoreline degradation is the worst in the upper harbor area of the corridor, it is recommended that efforts be undertaken by the city to restore the river banks while increasing public access to this portion of the river. Source: Conceptual River Corridor Plan, Scott Wende Architects, 1994.

5. In regards to the dredge spoils which the Army Corps of Engineers place on terminal property, it is recommended that they could be used for public recreation. A study should be performed to determine where dredge spoils might be useful to enhance recreational opportunities consistent

with the character of the river. Cooperation of the Army Corps of Engineers should be sought to assist in developing an appropriate program for use of dredge materials. Source: The Mississippi River in Minneapolis, Minneapolis Park and Recreation Board, 1975.

6. Provide public paths where safely possible along the terminal property so citizens may have access to the river. Source: The Mississippi River in Minneapolis, Minneapolis Park and Recreation Board, 1975. Source: Conceptual River Corridor Plan, Scott Wende Architects 1994.

D. Close Terminal and Use the Land for Other Purposes

1. Neighborhood organizations are most concerned with restoring the health of the river and increasing public access. They recommended development of a long-term acquisition and restoration plan for the river corridor which would increase access to the river's edge for neighborhood residents. Source: Conceptual River Corridor Plan, Scott Wende Architects, 1994.

2. Recommendations for the use of the terminal land range from relocating selected industries which are the source of neighborhood (but not environmental) complaints to the terminal site, redeveloping the entire site for light industrial use, and developing the site for either commercial, residential, park or a combination of those uses. However, it is also recommended that in order to avoid eliminating long-term options, heavy industries elsewhere on the west bank should not be relocated to the Upper Harbor area in the short term. Source: Upper Harbor Terminal: History, Status, and Options, MCDA, 1994.

V. RECOMMENDATIONS: POLICY AND ACTION OPTIONS

These recommendations were developed by the author. Further work is required by neighborhoods, city officials and other stakeholders.

A. Changing Land Use Patterns

Growing numbers of people question the appropriateness and necessity of locating industry along the riverfront. Minneapolis' planning documents and reports, as well as independent reports, have shown a move toward increasing public access and restoring natural systems along the riverfront and away from industry-dominated riverbanks. For example, the Conceptual River Corridor Plan calls for "the recognition that neighborhoods and their residents are the prime stakeholders in the future of the Upper River."

The UHT occupies a significant place on the riverfront. It is an underutilized and historically unprofitable and seen by many as a barrier to riverfront projects that would enhance the natural environment. A planning process that involves a broad range of stakeholders in a meaningful

discussion of potential land use alternatives would create a basis for sound decision-making about the site's future.

Recommendation #1: Create an inclusive planning process.
An inclusive, multi-stakeholder planning effort should be conducted to assess alternatives for the future of the UHT.

The multi-stakeholder group should include, but not be limited to, representatives of neighborhood organizations, residents most directly affected by land uses at the site, government agencies, elected officials, representatives of business organizations and businesses most directly affected by land uses at the site, environmental organizations, technical experts, and economic advisors. Private developers and Realtors should be consulted to help establish future land value scenarios for possible uses such as residential, parkland/restored natural wetland, commercial and light industrial. (See Appendix A. for an initial list of stakeholders).

The group should investigate what kinds of river-friendly and neighborhood-friendly alternative land uses would provide the city with revenue levels required to recapture the level of revenue lost over years of terminal operations. Consideration should be given to whether alternative land uses would increase, stabilize, or decrease land values in the surrounding neighborhoods. This multi-stakeholder group should assess alternative land use scenarios based on projected tax revenues, neighborhood revitalization benefits, and environmental restoration possibilities, among other key criteria.

Various public agencies have committed approximately $600,000 to create a comprehensive master plan for the upper river. As of April, 1997, city officials intend to include citizens in the planning process but have not defined how to do so. Interested citizens can call the Minneapolis Park Board Planning Department to get involved.

B. River Ecology and the Health of the River

Many Upper River neighborhood residents feel strongly that restoring the health of the river should be the number one goal in planning for future development along the riverfront. City, state and federal agencies and officials will be asked to consider old and new recommendations for the Upper River over the coming years, as future land uses continue to be discussed and planned. The UHT will operate at least until 1999, regardless of which recommendations are enacted. As a publicly owned terminal, the UHT should be a leader in addressing environmental issues and contributing to the health of the river.

Recommendation #2: Address environmental improvements at the UHT through a partnership between the City of Minneapolis, the State of Minnesota, River Services Inc., and river neighborhoods.

1. The UHT area has some of the worst shoreline erosion in north Minneapolis. River neighborhoods, the MCDA, the DNR, and RSI should work together to re-vegetate the riverbanks with native plants.

2. All of RSI's environmental permits should be monitored for compliance through a partnership between the city, river neighborhoods, and RSI. This could be accomplished through actions such as public "updates" including explanations of what the goals of the permit are and how RSI is accomplishing the goals.

3. A public meeting with MCDA should be held to explain their proposed grant-funded environmental improvement project and explore how citizens in the area can be involved with monitoring the outcomes and/or assisting in achieving the goals of the project.

4. River neighborhoods, the city, and RSI should work with state legislators to create new environmental law requiring the indoor storage of materials along riverfronts. This would be useful in minimizing salt and coal run-off from all terminals and would conceivably be of interest to other river communities in Minnesota.

5. A review of the Army Corps of Engineers' testing for contamination in dredge materials should be performed and released to the public.

C. Role of the MCDA

As this report has shown, many recommendations have been generated regarding the river and the UHT. In its 1994 report, the .MCDA's recommendations included the following:

- A feasibility study and analysis of each of the options should be performed.
- Identify and pursue short term actions to improve the existing status of the terminal until a long term option is selected with the assurance that any short term action won't prohibit selecting a future long term option.
- MCDA staff establish a process that develops both short and long term recommendations including affected agencies, private sector and the public. Recommendations would then be brought to the city council for consideration.

Recommendation #3: Implement MCDA's 1994 recommendations.

1. The MCDA should communicate what has been done to move forward with recommendations made in their report Upper Harbor Terminal: History, Status and Options.

2. The MCDA should work with river neighborhoods and the Planning Department to establish a process for generating effective, multi-stakeholder recommendations for the UHT site. Establishing a process is key to achieving effective input.

3. The MCDA's industrial development policy should be evaluated for the opportunities and barriers it creates regarding increased public use and neighborhood access to the river.

D. River Transportation

Businesses using river terminals along the Upper River have made it clear that the barging industry is essential because it is more economical than other forms of transportation. But how important is the UHT to the regional barge economy? When considering the case of the UHT - a municipally owned operation serving industries predominantly shipping their goods to areas outside Minneapolis - it is important to consider the regional need for this facility.

Recommendation #4: Analyze transportation patterns

The city should analyze a potential transition of UHT commerce to terminals down river. The analysis should provide answers to these questions, among others:

1. A majority of the commodities handled by the UHT do not remain in the area, but are shipped either to other counties in Minnesota, other states in the Midwest, to Canada, or overseas. How would closing the UHT affect the Upper River in terms of commerce, barging needs, environmental improvements, and neighborhood revitalization?

2. Since the UHT is not operating at capacity, and commodities are not destined for Minneapolis, what is the specific need to locate a public terminal on the Upper River?

3. Which publicly-owned river terminals specifically are capable of handling the UHT's commerce? How would using a different terminal and overland transportation system impact current UHT users?

4. What is the terminal's relationship to lock and dam operations and the continuation of dredging?

5. What are impacts of UHT closure on the Army Corps of Engineers maintenance and lock operations?

6. What would be the impact of change in the Army Corps of Engineers operations on other river users - commercial, recreational and commercial passenger?

E. Economic Viability

The UHT has a long history of financial trouble. Economic data, including total loss figures and future revenue streams, has been difficult to obtain. Some of the information is now available but has not been reviewed.

Taxpayers nationwide pay the operations and maintenance costs of the locks, dams, and navigation channels that link the UHT with the naturally navigable portion of the Mississippi River in St. Paul. These facilities include three locks and dams: the Upper and Lower St. Anthony Falls locks and dams and the Ford lock and dam (Lock and Dam #1); and miles of navigation channel

extending from the Mississippi's confluence with the Minnesota River to the UHT. These facilities are maintained by the Army Corps of Engineers. Operating them requires a full-time crew, periodic dredging of the navigation channel and maintenance and periodic modernization of the locks and dams.

Recommendation #5 : Obtain economic data recently made available to the public. Produce an analysis of the economic viability of the UHT and the related viability of the upper and lower St. Anthony locks and dam. Non-monetary costs -- such as environmental impacts and losses experienced by local neighborhoods -- should also be included in a cost-benefit analysis.

1. Neighborhoods can work in cooperation with MCDA and RSI to obtain some specific economic information about the UHT. Contact the MCDA and then the attorney for RSI as needed for assistance.

2. If information is difficult to obtain, request an "Advisory Opinion" in regards to the validity of the trade secret claims can be made to the Commissioner of Administration for Minnesota. Her office is located in the office of Public Information Policy Analysis within the Department of Administration. This could lead to the release of additional economic information.

3. A legal challenge through the Freedom of Information Act can be made if economic information of the UHT is not publicly disclosed.

4. An economic analysis should be produced by a more objective entity than the City of Minneapolis, for example the State of Minnesota.

It is critical to consider national as well as local costs of the UHT:

a. The costs of the St. Anthony and Ford locks and the related navigational channel imposed on federal taxpayers and costs/benefits to hydroelectric producers;

b. An assessment of the UHT's viability under different scenarios for reducing federal subsidies for navigation facilities (e.g. barge user fees, lock tolls, increased barge fuel taxes);

c. Consider whether the benefits of the UHT outweigh its costs to local and national taxpayers.

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Appendix A: Stakeholder Categories and Interview Questions

The following list of stakeholders and questions was developed for interview purposes. Contacts were not made in all categories. Interview results were used to provide information in this report. Answers to the questions in Section II were quantified but the resulting data was not statistically significant and is therefore not included here.

I. Stakeholders identified for interviews

A. Neighborhoods on or near the upper river

Bottineau - Randy Kouri
Camden - Barb Johnson, Sheila LeFavor
Columbia - Helen Johnson
Hawthorne - David Luce, Brad Nyberg
Lind-Bohanon
Marshall Terrace
McKinley - Nancy Beales, Rod Sykora, Jerry Nauman
Mississippi Corridor Neighborhood Coalition
North Side
St. Anthony West - Michael Rainville
Sheridan

B. Businesses using the UHT
(two users identified at the time of the report - there are more UHT users)

Benson Quinn and Harvest - Kurt Harstad
Harvest States

Also interviewed:
River Services Inc. - Jerry Christensen and Lee Nelson

C. Private terminals

American Iron and Supply Co. - Colleen Halpine
Bundee Cement Co.
J.L. Shiely Co.- Bob Bieragol
Owens Corning

D. Other businesses on the upper river

Gabby's

GRACO
Japs-Olson
Marshall Concrete
NSP
Paddleford Company - Jim Kosmo
River Liquors- Bob Marget
Riverview Supper Club
Scherer Lumber Yard - John Zitur
Siwek Lumber
West Broadway Business Association- Rod Wooten
Williams Steel

E. Related economic interests outside the area

Railroad Industry
Tourism Industry/National Park Service/MNRRA
Trucking Industry

F. Government

City of Minneapolis:
Minneapolis City Council - Joe Biernat
MCDA - Jim Forsyth
Minneapolis Parks

State of Minnesota:
Legislature - Phyllis Kahn -Representative, Larry Pogemiller - Senator
MNDOT
Watershed Management Districts

Federal:
Congress
U. S. Army Corps of Engineers - Don Wilcox, Ken Gardner
National Park Service/MNRRA - Mike Madell

G. Upper river recreational users

canoe and kayak clubs
fishing organizations
bike clubs
pedestrians and walking clubs
residents and homeowners on the Mississippi

H. Environmental oganizations

American Rivers -Scott Faber
Friends of the Mississippi River

II. Interview Questions

1.) What is your relationship to the Mississippi Riverfront between Lowry and Dowling Ave. N.?

2.) Which of the following categories describes you?
Agency staff?
Business?
Elected Official?
Neighborhood Member?
Environmental Organization?

How long have you been in that/those roles?

3.) Do you have any relationship to the UHT?

4.) What is your understanding of the functions of a barge terminal?

5.) What is your understanding about who owns and operates the Upper River Barge Terminal?

6.) Who do you think uses the services of the UHT?

7.) How many different companies do you think use the UHT?

8.) What percent of those businesses do you think are in Minneapolis? the metro area? outside the metro area?

9.) According to the MCDA, 75% of the businesses are outside the Metro area.
What does it mean to you that 75% of the businesses are outside the Metro area in terms of the terminal's future use?

10.) What do you know about tax payer support for the UHT?

If the interviewee asked for information regarding question #10:

The UHT is leased to River Services Inc. to operate it for the city. The company's operations are usually able to pay its operating expenses, but has not been able to pay the terminal's debt service to the city. As a result, debt services are paid indirectly by taxpayers through MCDA who

allocates funds from their tax increment revenue generated at North Washington Industrial Park. Annual transfer from the tax increment to the terminal is approximately $700,000.

11.) At the end of 1999, the General Obligation Revenue Bond will be paid off and some believe the terminal will be self-supporting. This may be a time when terminal operations can be changed. What do you think are the advantages to keeping the terminal operations as they are?
12.) Disadvantages?

13.) The Army Corps of Engineers needs one million tons of commerce per year to move through the St. Anthony Locks and Dams in order to justify their operations on the Upper River. The municipal terminal generates one million tons while the four other private terminals generate about 600,000 tons annually. It has been suggested that if the terminal closes the Corps of Engineers would shut-down the Locks and Dams. What options would this loss of terminal revenue leave for the river-dependent businesses?

14.) Do you think anything should be done for those river-dependent businesses if the upper river is no longer available to barging?

15.) What affect would to closing of the terminal/locks and dams have on ***(part one)*** commercial (other than barging) transportation and ***(part two)*** recreation on the river?

16.) How do current terminal operations affect ***(part one)*** water quality? ***(part two)*** air quality? ***(part three)*** the quality of land along the river banks? ***(part four)*** the quality of life in the adjacent neighborhoods?

17.) What would you like to see happen to the riverfront land (approx. 41 acres) if the terminal was closed?

18.) Can you recommend other people to talk to, other resources to read?

19.) Do you have any questions?

Appendix B: Natural and Geologic History

The Twin Cities metro area was a vastly different geographic place 12,000 years ago, dominated by glacial waters and immense limestone waterfalls. Near what is now downtown St. Paul, a waterfall 2,700 feet across and 175 feet high washed the melt waters of the Glacial Lake Agassiz downstream. Due to the scouring action of the water rushing over the river valley's limestone bedrock, large slabs of limestone collapsed into the river causing the falls to continuously move upriver.

About 10,000 years ago, the falls met with the junction of the Mississippi and Minnesota Rivers, at which time the falls split in two. The falls which followed the Mississippi River upstream are now known as St. Anthony Falls, named by Father Louis Hennepin after his patron saint, Anthony of Padua in 1680. The forces of nature predicted a natural extinction to the St. Anthony Falls, since the limestone covering the soft sandstone ends only 1,200 feet upriver of its present location. Due to the thinness of the limestone bedrock in this area, the falls would have naturally progressed upriver until eroding into rapids.

The St. Anthony Falls reached their present location in the 1800s. The upriver retreat of the falls were greatly accelerated by early settlers. Early in this century the settlers began building flour and timber mills along the waterfall's edge. In order to supply their mills with water, they drove shafts into the limestone bedrock and dug tunnels in the sandstone beneath. Logs pounded the falls when escaping from their holding ponds during floods. Dams diverted water and exposed limestone to freezing and thawing. These conditions added to the erosion of the limestone and the underlying sandstone. In the mid-1800s the falls had reached their limestone cap. These man-made irritations greatly accelerated the erosion of St. Anthony falls; which without intervention would quickly erode into rapids.

Milling along the St. Anthony Falls continued throughout the 1800s. Once known for its breathtaking landscape, this region attracted tourists, artists and writers. However, industrial waste and noise led to an early demise of tourism in the area. In 1868 the Eastman and Merriam mill owners began to excavate a tunnel under Nicollet and Hennepin Islands for their tailrace. During digging operations the tunnel began leaking and water rushed in creating a scouring whirlpool. This fast acting erosion almost caused the collapse of Hennepin Island and the St. Anthony Falls. To evade total destruction of the falls a temporary dam was built in 1869, while citizens and mill owners debated long-term solutions. After many failed attempts at repair, the Army Corps of Engineers decided the best and possibly only solution was to build a concrete wall and dike along the length of the river. Between 1876 and 1885 the Federal government spent $615,000 to repair the damage with the dike, concrete apron below the falls, and two low dams above the falls to maintain a safe water level. After construction ended, maintenance and operations once again became the duty of the City of Minneapolis and the water power companies.[1]

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[1] Information in this section from the US Army Corps of Engineers Engineering the Falls. St. Paul District, p.1-16.

Meanwhile, attempting to make the river safe for commercial navigation, the Army Corps of Engineers repeatedly altered the flow of the river throughout the later 1800s and into the 1900s. Over these years the Army Corps of Engineers cleared boating obstructions from the river which included fallen trees and rocks. Sediment accumulated around wing dams built by the Army Corps and vegetation invaded to stabilize the banks, effectively moving the banks inward and forever changing the Mississippi River waterway.[2]

[2] John O. Anfinson, St. Paul District Army Corps of Engineers, Commerce and Conservation on Upper Mississippi River, p.4-16.

Appendix C: Engineering History of the Upper Mississippi River

The engineering history on the Upper River is closely tied to the history of the barge industry. The Mississippi River is the major river outlet from the Midwest to the rest of the world. During the expansion of the United States, it was argued that creating a Mississippi River transportation link would allow Midwesterners to realize their Manifest Destiny or their full economic potential by shipping agricultural goods throughout the world.[3]

Over the last 125 years Congress has approved three navigation projects on the Upper Mississippi River in response to various demands from the public for cheap and reliable commercial transportation. With each of three navigation projects approved by Congress, locks and dams were constructed to provide a more reliable navigation channel.

Prior to the mid-1800's, the northern portions of the Mississippi River were characterized by extensive side channels, backwaters, snags, sandbars, and wide shallows all features which delayed and sometimes sank steamboats. Spring floods rerouted navigation channels while late summer low waters removed navigation channels completely. Moreover, the natural river undercut banks, and collected rocks, soil and trees - constantly creating new hazards.

Demand for improvement of the river channel began to grow with the hey-day of the steamboat in the 1850s. In 1866, due to increasing public pressures, Congress directed the US Army Corps of Engineers to clear the navigation channel by dredging to remove snag trees and rocks, overhanging trees, and sunken vessels. Despite the Army Corps of Engineers' efforts, the river remained difficult to navigate.

In June of 1878 following the Civil War, congressional action was taken in response to increased Midwest population, agricultural output, and the monopoly of the railroads over transportation links to the Midwest. The first of three navigation projects built a 4 ½ foot channel extending from St. Paul to St. Louis, included the construction of short lateral canals with navigation locks to by-pass the most seriously obstructive rapids. The Army Corps then built wing dams, placed in a series along the channel shore to reduce its width, and closing dams to deliver more water to the channel. Narrowing the river with wing dams increased its velocity, helping to cut through debris.

Toward the end of the nineteenth century, the inland waterway transportation boom faded as other forms of faster and more dependable transportation were made available. During 1880-1890 with the hey-day of the Steamboat over, river traffic steadily declined. By 1907, hoping to revive river commerce, Congress was persuaded to authorize a second navigation project, a 6-foot channel which called for more wing dams, more closing dams, and more dredging. The 6-foot channel was completed by 1930 but did little to increase reliable river commerce. By this time, railroads monopolized the passenger and commercial traffic and the Upper Mississippi River navigation waterways were no longer in use. It appeared that the days when river commerce would play an important role in the economy of the region were over. The Midwest was effectively declared 'land-locked' and rail rates sky rocketed by more than 100 percent.

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[3] Ibid., p. 4.

With the twentieth century came many advancements in the technology of engineering locks and dams. With improvements it was thought that the upper Mississippi Valley would greatly benefit from long-haul, low-cost water transport. Responding to the railroad monopoly and the ineffectiveness of the 6-foot channel project to create a reliable navigation route, business and navigation proponents convinced Congress in 1930 to create a 9-foot channel to allow for dependable river transportation. Congress agreed to fund this third navigation project in the 1930 River and Harbor Act.

"The Upper Mississippi River Nine-foot Channel" describes the purpose of locks and dams: is to create a series of slackwater pools with adequate depths for today's river transportation. The locks, in effect, act as steps by which vessels are lifted or lowered from one pool to the next, while the pools themselves remain practically level.

The 9-foot channel project included a 669 mile stretch of the river between what is now the first lock at St. Anthony Falls and lock #27 near St. Louis. There are 29 locks and dams along this stretch of the river which allow commercial transportation to move easily along a channel 420 feet deep and a minimum of 400 feet wide in the Mississippi River. In 1940 the 9-foot channel was completed which allowed barges to reach the 16 acre city dock under the Washington Ave bridge.

Meanwhile, since the new channel was expected to increase river traffic into Minneapolis, pressure intensified to extend the channel to the north end of the city where land for a larger terminal was available. In 1937, Congress approved extension of the channel. This extension included building the St. Anthony Locks and Dams, creating the UHT, and dredging the channel between the falls and the new harbor. Funds did not become available until 1945, however, and the project was not completed until 1963. According to the "Upper Harbor Terminal: History, Status and Options", during this extended period of construction a navigation channel was built on the Minnesota River which captured most of the commerce expected for the Upper Mississippi River in Minneapolis. After the US Army Corps of Engineers presented an extensive study on the "river's possibilities to serve as a modern transportation artery," the Corps of Engineers reevaluated their building plans to extend the channel. The Army Corps reasoned that since the new channel on the Minnesota River captured most of the projected commerce, there was insufficient economic justification for the project. However, community and political pressures continued and Congress appropriated funds. The UHT was completed in 1963.[4]

[4] Ibid.

Appendix D: Barge Industry on the Mississippi River

According to the "Upper Mississippi River Nine-foot Channel" the growth of commercial traffic since the 9-foot channel project was completed in 1939 (including the portion above St. Anthony Falls) has been "rapid and steady." Today, inland barge transportation is used to ship a variety of commodities from Minnesota to Louisiana and all stops in between. In the past, steamboats shipped commodities up and down river. The largest cargo ever carried weighed comparatively little at 2,390 tons. Today a diesel towboat will pull 15-20 barges carrying up to 20,000 tons on a 1,500 mile trip from Baton Rouge to St. Paul.

Types of barges commonly used include open barges for coal, tank barges for petroleum products, and covered barges for grain and mixed cargo. In addition, many specialized and expensive barges are built for less common commodities. These carry materials such as liquid methane at temperatures of negative 258 degrees Fahrenheit, molten sulfur at temperatures of 300 to 350 degrees, bulk cement mixed with air for easy transfer, carbon black, and anhydrous ammonia under 250 pounds of pressure.

The greatest volume of single bulk commodity shipped by barge on the river are petroleum products-gasoline, kerosene, fuel oil, lubricating oil-moving north from the oil fields of Texas and Louisiana. Large quantities of coal also move upstream mainly from central and southern Illinois and western Kentucky. The principle "downbound" product is grain - corn, wheat, oats, barley , and rye. Most of the grain will travel from the farms of the central Midwest to riverside grain elevators or to railroad cars and then on to New Orleans by barge. There the grain will be transshipped by ocean vessels for overseas destinations. A few of the smaller commodities shipped on the River include: iron and steel products, fertilizers, sulfur, cement, aluminum ingots and plate, sugar and dehydrated molasses.[5]

Product Transportation

Competition between the railroad, trucking, and barging industries keeps rates affordable for companies that transport in the Mississippi River region. Two reports that discuss the transportation benefits of barges are discussed below. Without the barging industry, considered to be the most affordable, efficient, and environmentally sound of the transportation options, the cost of rail and truck transportation would skyrocket and create an economic burden for many businesses that deal in low profit-margin commodities such as grain and gravel.

Environmental Advantages of Inland Barge Transportation, US Department Of Transportation Maritime Administration, 1994.

In this report, the commercial navigation industry argues that theirs has the least environmental impact of all modes of transportation. According to the US Department Of Transportation Maritime Administration (1994), the barge industry is the safest, most energy efficient, and least environmentally destructive. The report concludes, "on a ton-mile basis [the barge industry] consumes less energy, contributes less noise and pollution, has fewer spills, generates less congestion, and has fewer accidents than any other mode of transportation."

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[5] US Army Corps of Engineers, The Upper Mississippi River Nine-foot Channel.

The report claims that barge transportation is more efficient than truck or rail, based on the following factors. First, each barge can carry up to 1500 tons of freight whereas one rail car carries 100 tons and one large semi carries only 26 tons. Therefore, one barge equals 15 jumbo hoppers (rail cars) equals 58 trucks. The advantage of barge tows not only lies in the minimal space they occupy, but also in the number of miles one ton of materials is moved on one gallon of fuel. A large diesel truck moves one ton 59 miles on one gallon of fuel, rail moves 202 miles while barges move 514 miles per gallon. The relative energy efficiency, and therefore the comparatively low air pollution, in this comparison, favors barge transport.

The Mississippi River and Its Vital Importance to Minnesota Agriculture

In addition to the environmental advantages of commercial navigation, the barge industry also argues for the economic benefits barge transport provides. According to this pamphlet which compiles statistics from the National Agricultural Statistics Service, the Minnesota Department of Agriculture, and the US Army Corps of Engineers, Minnesota corn and soybean producers saved $93 million in 1992 by moving grain on the river rather than by rail.

The pamphlet also suggests that the bulk of agriculture producers who move their products by rail also benefit because of the existence of waterway transportation. The pamphlet sites Army Corps of Engineers statistics which state, "for every $1.00 cost increase in grain transportation costs, at least $.75 is borne by the grain producer." Therefore barges increase the economic efficiency of product transportation.

Appendix E: Brief Description of Neighborhoods

Hawthorne is one of the older neighborhoods in Minneapolis, with over 80 percent of the residential structures built before 1920. Over 20 percent of the residential structures were in substandard condition in 1992, substantially above the 10 percent city-wide rate. The percentage of all residents below poverty level in the Hawthorne Neighborhood increased by almost 20 percent between 1980 and 1989. In 1989, almost 40 percent of Hawthorne residents live below poverty level, while the city-wide rate is just below twenty percent. While the total population in the Hawthorne Neighborhood remained stable between 1980 and 1990, the racial/ethnic makeup changed considerably during that time. The white population decreased from 87 percent in 1980 to 53 percent in 1990 while the African-American population increased from 5 percent to 31 percent. Native American, Asian American, and Hispanic populations also increased during that time.

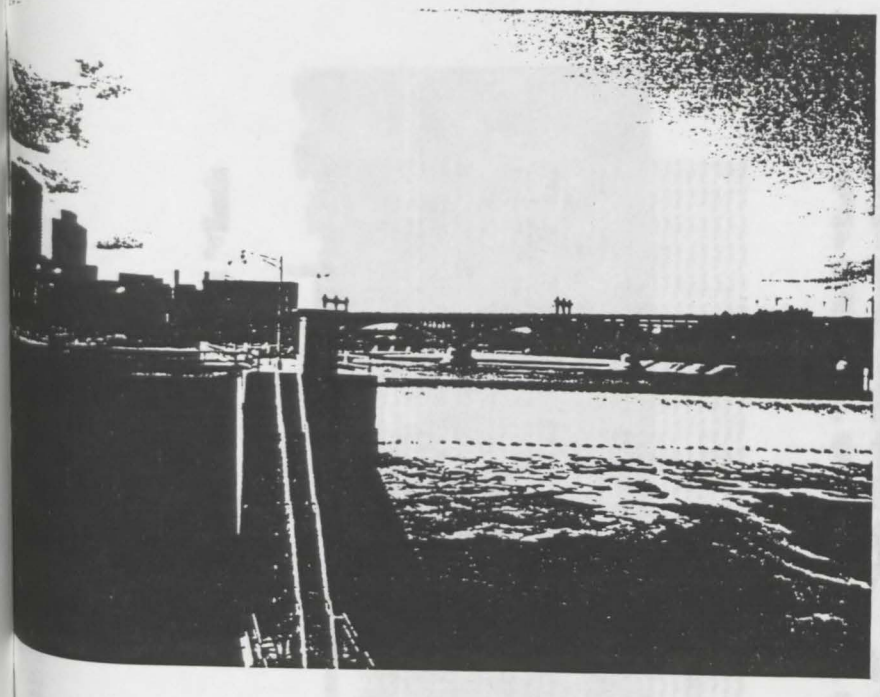
Almost 60 percent of McKinley's residential structures were built before 1920 and less than 5 percent after 1960. The percent of residents below the poverty level was slightly above the city wide average in both 1979 and 1989. The racial/ethnic makeup in 1990 consisted of almost 80 percent Caucasian. The remaining 20 percent is a mix of African American, Native American, Hispanic and Asian American peoples.

Appendix F: 1996 Budget for Upper Harbor Terminal

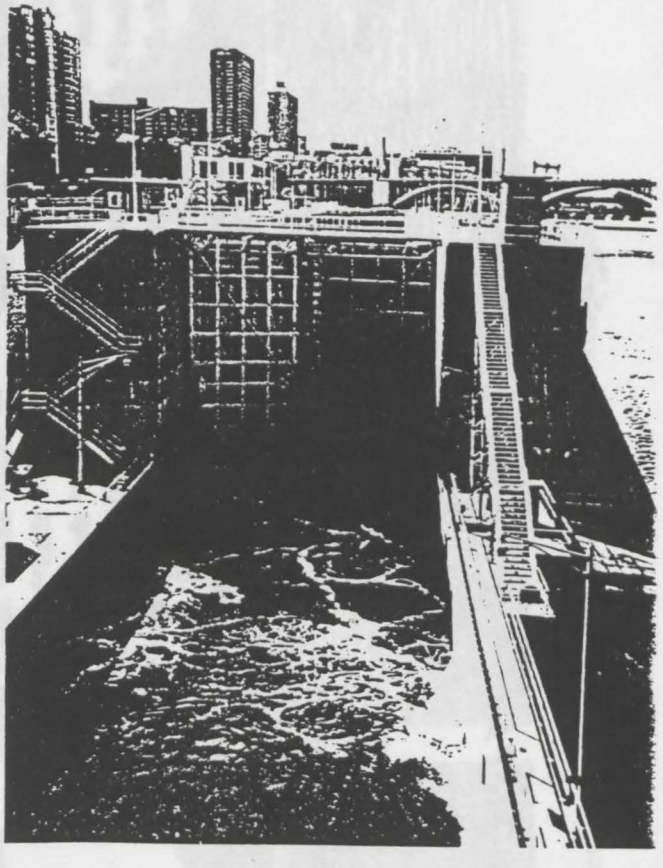
Payroll Wages and Taxes	$835,000
Temporary Help	$0
Pensions	$158,640
Workers Compensation	$197,875
General Insurance	$37,204
Health/Disability	$27,276
Boat Insurance	$13,876
Professional Services	$21,996
Barge Surveying Expense	$750
Freight Charges	$180
Supplies-Office	$12,600
Supplies-Shop	$12,600
Supplies-Safety	$12,600
Postage/Delivery	$2,400
Travel Expense	$2,820
Auto Expense	$1,920
Dues and Subscriptions	$720
Licenses and Permits	$2,400
Rent-Rail Scale	$15, 060
Utilities-Electricity	$105,000
Telephone	$8,640
Security	$14,400
Rent-Equipment	$36,000
Repairs and Maintenance	$500,041
Demurrage	$11,700
Marketing Expense	$780
Bad Debt Expense	$0
Misc. Expense	$15,000

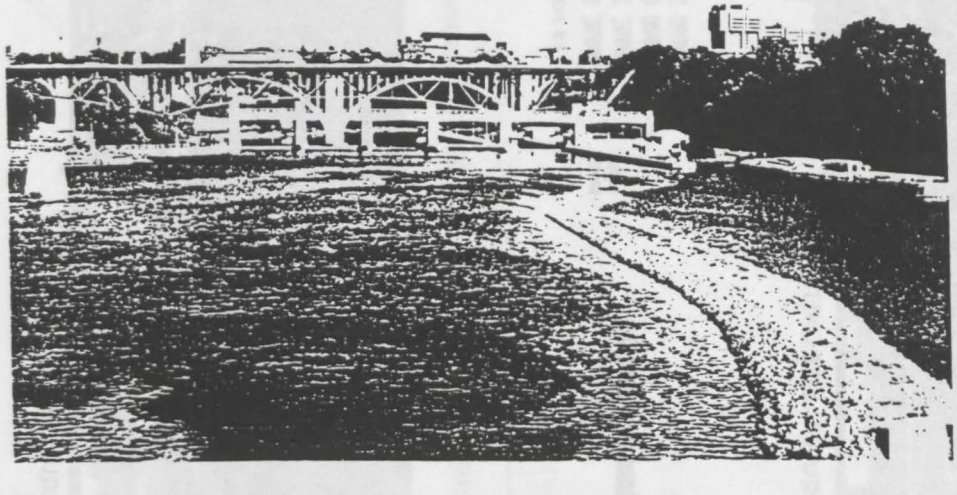
River Terminal Budget		
SOURCES		
Projected 1996 Revenues		$2,455,950
Rents and Settlements		$181,800
Interest Income		$10,000
Transfers (from MCDA tax increment revenue)		$722,000
	Total	$3,369,750
USES		
Annual Operating Budget		$2,047,538
Debt Service		$1,082,851
Management Fee		$195,324
MCDA Admin.		$44,037
---	Total	$3,369,750

APPENDIX G



Upper St. Anthony Locks



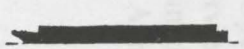


Lower St. Anthony Locks

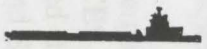
COMPARE

DEPARTMENT OF TRANSPORTATION
IOWA

CARGO CAPACITY

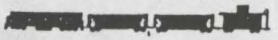


BARGE
1500 TON
52,500 BUSHELS
453,600 GALLONS



15 BARGE TOW
22,500 TON
787,500 BUSHELS
6,804,000 GALLONS

JUMBO HOPPER CAR
100 TON
3,500 BUSHELS
30,240 GALLONS



100 CAR UNIT TRAIN (GRAIN)
10,000 TON
350,000 BUSHELS
3,024,000 GALLONS

LARGE SEMI
25 TON
875 BUSHELS
7,560 GALLONS

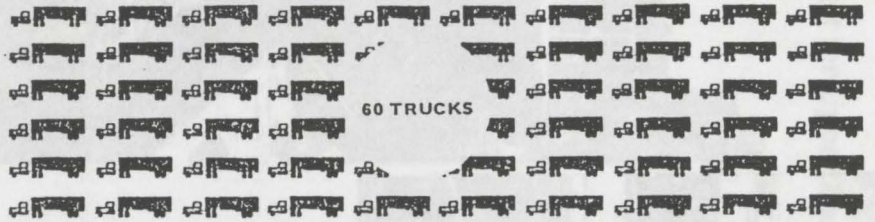
EQUIVALENT UNITS

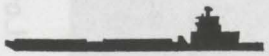
1 BARGE

=

15 JUMBO HOPPERS

=





1 TOW

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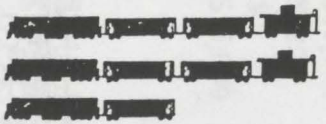
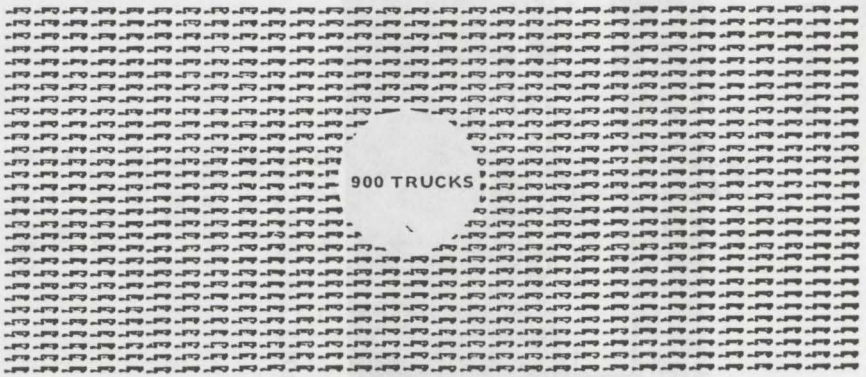


2¼ UNIT TRAINS

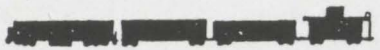
=



EQUIVALENT LENGTHS

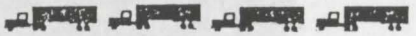
¼ MILE

15 BARGE TOW



2¼ MILES

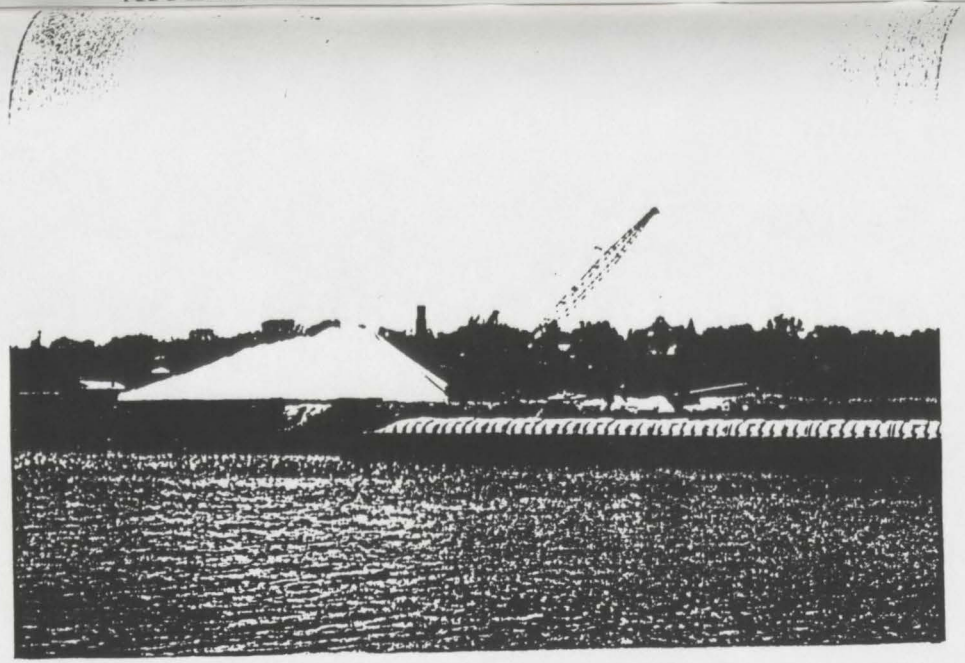
2¼ UNIT TRAINS



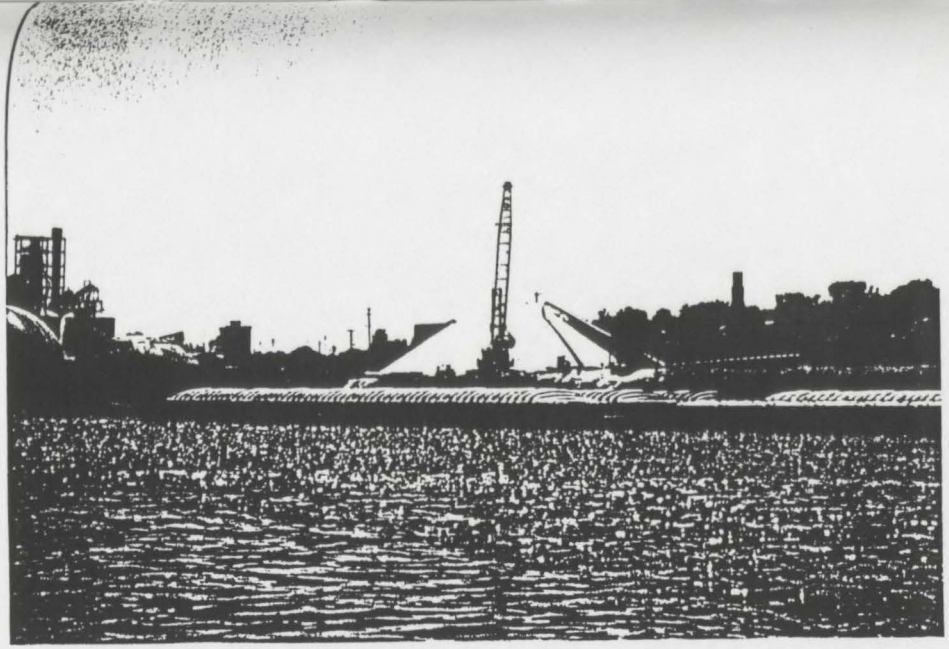
36 MILES
ASSUMING 150 FT.
BETWEEN TRUCKS

APPENDIX H RELATIVE ENERGY EFFICIENCIES OF DIFFERENT MODES OF TRANSPORTATION

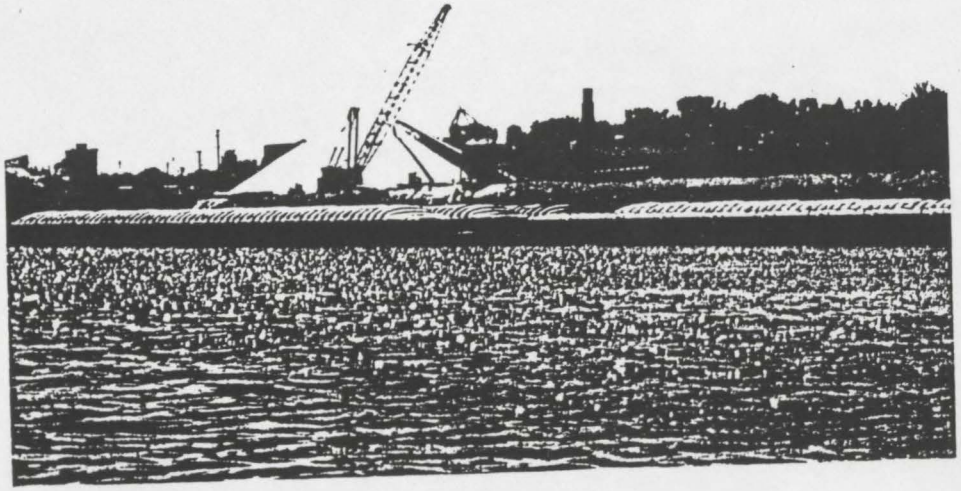
Prepared by:
Planning and Research Division



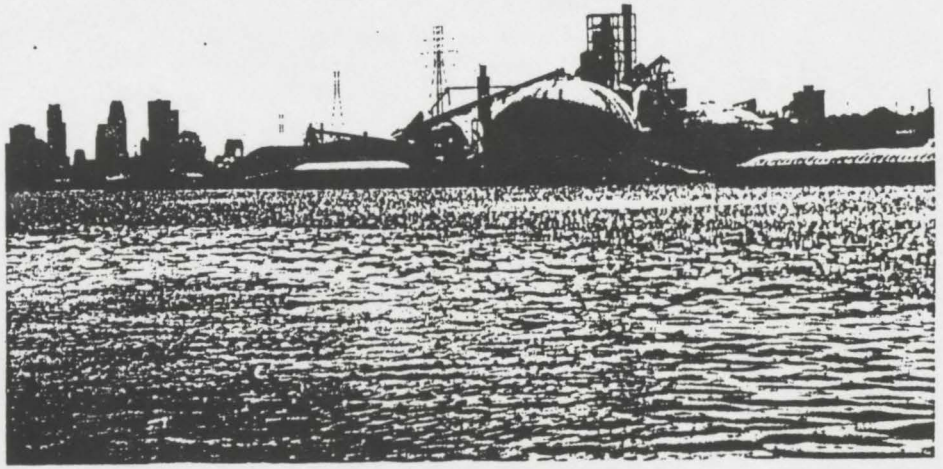
Unloading Salt from Barge at Terminal



Salt run-off into river



Note: Salt clouds add to air pollution during unloading of barges.



Uncovered coal piles in background